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Agricultural Memorandum No. 254

The Effect of Rainfall on the Butterfat content of milk

The data for the butterfat content of milk from a month by month survey of average yield of herds, inclusive of Channel Island cows, based on a sample of one out of every five supplies are available from M.M.B. Progress Reports from October 1957 to September 1967.

		Change from previous month				Change from previous quarter	
Month	Mean	Mean	Range		Mean	Mean	Range
Oct.	3.97	+0.12	08-17				
Nov.	4.04	+0.07	03-11	4th quarter	4.01	+0.24	21-26
Dec.	4.01	-0.03	05-02				
Jan.	3.90	-0.11	15-04				
Feb.	3.79	-0.11	19-07	1st quarter	3.81	-0.20	25-10
Mar.	3.73	-0.06	10-02				
Apr.	3.67	-0.06	08-01				
May	3.58	-0.09	13-05	2nd quarter	3.62	-0.19	23-16
Jun.	3.60	+0.02	-02-+09				
Jul.	3.70	+0.10	06-12				
Aug.	3.76	+0.06	01-10	3rd quarter	3.77	+0.15	12-17
Sept.	3.85	+0.09	05-13				

The largest variation in the changes from quarter to quarter are those from the 4th to the 1st that is, in late winter. This change dominates the 9 month change from 2nd quarter to 1st quarter. The dominant meteorological factor appears to be the June rainfall, which in previous work has seemed to be a good indicator of hay quality.

Expressing the June rainfall factor, as hitherto, as negative below 2.0 in, positive above 3.0 in and zero in between, the correlation with both changes (4th to 1st, 2nd to 1st) is 0.86. The two years which deviated from this pattern had dry summers.

The first attempt at predicting a 9-month change in butterfat therefore includes two factors:-

June rainfall; measured as above. = J

June, July, August rainfall; deficiency below 3.0 in, zero for all excess. = S

the rainfalls being the figures averaged for England and Wales.

The formula then found was:-

Change 2nd quarter to 1st quarter = 0.194 - 0.03J - 0.008S

/ Results

Results

Year	2nd quarter	1st quarter	Change	J	S	Estimate	Error
1957-58	3.62	3.82	0.20	-0.1	0	0.20	0.0
1958-59	3.64	3.79	0.15	1.4	0	0.15	0.0
1959-60	3.56	3.73	0.17	-0.2	3.2	0.17	0.0
1960-61	3.57	3.76	0.19	-0.1	0	0.20	+0.01
1961-62	3.59	3.80	0.21	-0.5	0.7	0.21	0.0
1962-63	3.63	3.86	0.23	-1.3	0.6	0.23	0.0
1963-64	3.64	3.82	0.18	0.4	0	0.18	0.0
1964-65	3.63	3.83	0.20	0.1	0.9	0.18	-0.02
1965-66	3.64	3.83	0.19	0.0	0	0.19	0.0
1966-67	3.64	3.83	0.19	0.3	0	0.19	0.0

The 1964-65 error was not quite so large as it appears; taken to the third decimal place the figures were:- actual 0.197, estimate 0.184, error 0.013. This implies that by the end of August, a forecast can be made of the mean butterfat content during the next January, February and March.

Any comments or suggestions on this paper should be sent to Mr. L.P. Smith at Bracknell.

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